CBRN Hydration

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Hydrate or Die

“The only two things you really need to fight a war are: water and bullets.”

- unknown smart person

Heat Illness/injury in the Army

- From 1993-2002, 1,440 Army personnel admitted to hospital for treatment of heat injury. (Avg. rate of 3.0 per 1,000 person-yrs.)
- From 1997-2002, 8,084 soldiers were treated as outpatients for heat illness.

US Army Hydration Requirements

Fluid Replacement Guidelines for Warm Weather Training
(Applies to average acclimated soldier wearing BDU, Hot Weather).

Heat Category	WBGT Index, °F	Easy Work		Moderate Work		Hard Work	
		Work /Rest	Water Intake, Qt/hr	Work /Rest	Water Intake, Qt/hr	Work /Rest	Water Intake, Qt/hr
1	78-81.9	NL	½	NL	¾	40/20 min	¾
2 (Green)	82-84.9	NL	½	50/10 min	¾	30/30 min	1
3 (Yellow)	85-87.9	NL	¾	40/20 min	¾	30/30 min	1
4 (Red)	88-89.9	NL	¾	30/30 min	¾	20/40 min	1
5 (Black)	> 90	50/10 min	1	20/40 min	1	10/50 min	1

- The work:rest times and fluid replacement volumes will sustain performance and hydration for at least 4 h of work in the specified heat category. Individual water needs will vary ± ¼ qt/hr.
- NL= no limit to work time per hour.
- Rest means minimal physical activity (sitting or standing), accomplished in shade if possible.
- **CAUTION:** Hourly fluid intake should not exceed 1½ quarts.
- Daily fluid intake **should not exceed 12 quarts.**
- Wearing body armor add **5°F** to WBGT Index
- Wearing MOPP overgarment add **10°F** to WBGT Index.

Easy Work	Moderate Work	Hard Work
• Weapon Maintenance • Walking Hard Surface at 2.5 mph, ≤ 30 lb Load • Manual of Arms • Marksmanship Training • Drill and Ceremony	• Walking Loose Sand at 2.5 mph, no Load • Walking Hard Surface at 3.5 mph, ≤ 40 lb Load • Calisthenics • Patrolling • Individual Movement Techniques. i.e. low crawl, high crawl • Defensive Position Construction • Field Assaults	• Walking Hard Surface at 3.5 mph, ≥ 40 lb Load • Walking Loose Sand at 2.5 mph with Load

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Operational Hydration Challenges

- How to drink continuously
- How to stay operational
- How to have enough water available
- How not to drink to much to fast

Basic ‘CamelBak’ Concept

Clean or CBRN Environment

- Water readily available
- ‘Hands-free’
- Drink a little bit all the time
- Sufficient, quiet, durable, operational across all spectrums

US Army SHS Study 2000

SUBJECT: Memorandum Report – Nuclear, Biological, Chemical (NBC) Soldier Hydration System Limited Objective Experiment

b. Conclusion(s): The SHS experiment confirmed that a hydration system which enables soldiers to hydrate on the move and during the performance of mission essential tasks is preferred over the current canteen method for hydrating in MOPP IV.

c. Recommendation (s): Based on the enhanced hydration capability the SHS provides to soldiers in MOPP IV, we recommend that a formal requirements document be written to support soldier hydration in a nuclear, biological, chemical (NBC)/toxic industrial chemical (T[illegible] environment.

Challenges For CBRN Hydration

- Flexible vs. rigid
- Connections – mask interface
- Water flow rate
- Mask personnel interf
- Test standards
  - Materials
  - Full system
  - Field testing
- Interoperability
- Training

1st/2nd Generation Systems

- Flexible
- Heavy
- Expensive
- Hard to manufacture
- Training issues
- Interoperability issues

4th Generation Systems

- Very flexible
- Light weight
- Significantly less expensive
- Manufacturing flexibility
- Matches current standard issues interfaces for training and interoperability

Other Issues

- Water storage in a chem environment
- Refill in a chem environment
- Disposal

Questions??

OK, let’s go drink…

(*Water of course*)